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SOME COMMON FALLACIES ABOUT KANSAS WEATHER.

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KANSAS apparently leads all other interior states in the number of reports of adverse weather conditions and spectacular storms that have emanated from it. Being preeminently an agricultural state, its prosperity from year to year has depended upon its weather, and there seems to have been an unfortunate tendency from the beginning of its history to give undue publicity to the unfavorable features. We seldom hear about the unpleasant or damaging weather in other states whose climate is widely advertised, but the terms, "droughty Kansas" and "Kansas cyclone" have almost become a part of our spoken language. Even yet, a great many persons who are not familiar with the conditions have difficulty in reconciling the numerous reports of droughts and storms with the fact that the state ranks so high in per capita wealth and general prosperity.

The average annual precipitation of Kansas, which includes the moisture from rain and melted sleet and snow, ranges from forty-four inches in the southeastern county to a little more than fifteen inches along the Colorado line. Over the eastern half it equals that of Iowa, Wisconsin and Michigan, and is only a little less than that of Illinois, Indiana or Ohio, and it occurs at a more opportune time of the year than the precipitation of any of these states. From 71 to 78 percent of the annual amount for the entire state occurs in the six crop-growing months, April to September, inclusive, and there is no state in the country, except a few along the South Atlantic and Gulf coasts that, taken as a whole, receives as much rain during the summer months as the eastern third of Kansas. Even the middle third of the state receives slightly over twenty inches during these six months, which is within two inches of the amount that falls during the same period in Illinois, Indiana, Ohio, New York and the New England states, while the western third, the "semiarid region," has an average precipitation of more than sixteen inches for this period, which almost equals the amount during these six months in Michigan and Wisconsin, and is approximately three-fourths of the average for the state of Iowa for that season of the year.

It is true that droughts occur from time to time in Kansas, but by far the greater number of them are confined to the western counties, where the chief crops are those that can be produced with light precipitation. A chart issued by the Weather Bureau shows that the occurrence of droughts during the crop-growing season in the eastern part of the state is scarcely more frequent than in Iowa, Illinois, Indiana, or even the New England states, and less frequent than over most of Wisconsin, yet none of these states is spoken of as being droughty. It is interesting to note in this connection that the combined value of the wheat and corn raised in Kansas has exceeded the combined value of these two crops in any other state more than once in recent years, and that over 50 percent of the state's yield of these is produced in the middle third, where the average annual precipitation ranges from twenty-two to thirty-two inches, and droughts (periods of thirty consecutive days or more without at least a quarter of an inch of precipitation within twenty-four hours' time) have occurred on an average of once a year in the crop season for the past twenty years.

To give Kansas credit for being the "cyclone state" is almost as erroneous as to use the term "cyclone" instead of tornado to designate these violent whirling storms with the funnel-shaped cloud. That tornadoes do occur within the state practically every year cannot be denied, but it should be considered that, while the area of the state exceeds 80,000 square miles, the path of an average storm of this character does not cover more than three square miles, and many are a great deal smaller, so that the path of one can generally be represented by a pin scratch less than an inch long on a map of the state the size of one usually given in an atlas.

In one of the most complete reports on tornadoes of the United States ever published, Prof. A. J. Henry, of the Weather Bureau, gives the total number for the eight-year period, 1889-1896, in the different states. This shows that when the relative area of the states concerned is considered, the number of tornadoes in Kansas per unit area is practically the same as the corresponding number in Iowa, and but slightly greater than the number per unit area in Illinois, yet neither of these has Kansas's undesirable reputation for being a tornado state. In a very complete climatology of the United States issued a few years ago by the Weather Bureau, a compilation of the great disasters attributed to tornadoes in various parts of the country is given, and it is interesting to note that none of these occurred in Kansas.

Professor Henry, in his report, has deduced that even in the states where tornadoes occur most frequently, "the probability that any area 100 miles square will be visited by a tornado in any year is generally less than certainty," and further, "for any specific area or farm of one square mile the probability (of being visited by a tornado) is less than one-sixteenth of one percent per century."

During a period of twelve years for which definite information regarding the destruction by tornadoes is available, the average annual number of deaths directly due to these storms is 14, or less than the number caused by lightning, and the average annual propertly loss by these storms is insignificant when compared with the total wealth of the state or the annual loss by floods and hail, yet none of the others has attracted the notice given the damage by tornadoes.

Kansas has also a reputation for being a windy state, when as a matter of fact the most recent compilation of wind velocity records over the country shows that the winds of the eastern half of the state are not noticeably greater than those of Illinois, Indiana, or Ohio, and are less than those of Michigan, and that western Kansas is not as windy a place as western Oklahoma or the panhandle of Texas.

The roving disposition of many Kansans, who go to summer resorts in the heated periods and seek milder climates in winter, as well as a somewhat prevalent belief that the only cure for the dread disease, pulmonary tuberculosis, is the equable climate of the Southwest, has resulted in a rather widespread belief that Kansas weather is not conducive to bodily comfort and good health. We should remember in this connection that bodily comfort involves a personal equation, since the ideal climate in regard to temperature and humidity does not exist in any part of the world.

It is true that uniformity of weather from day to day is the exception in the state, and abrupt temperature changes are common, especially in winter. High afternoon temperatures are often recorded in summer, and minimum temperatures of —10° and —20° are rather common in winter, but during the heated periods the air becomes dry, and "sensible temperatures," the ones really felt by the body, are not nearly so high as those in more humid states where the temperature seldom rises above 95°. In the western part of the state warm nights are exceedingly rare and heat prostrations almost unknown. The cold weather of winter is also rendered less disagreeable by the fact that the snowfall is light when compared with that in many other northern states.

Modern medical science has of recent years come to the conclusion that tuberculosis stands almost as good a chance of being cured in a climate like that of Kansas, other things being equal, as in the far-famed climate of the Southwest, and that Kansas climate, plus the care and rest and proper food of a good home, is much more likely to effect a cure than indifferent care in a health resort. This is not surprising in view of the fact that Kansas receives more sunshine each year than any state between it and the Atlantic, or between it and the Canadian boundary, and considerably more than what is commonly called the "Sunny South." The western third of the state is a close rival of southern California in this respect, and the air in those western counties is almost as bracing and exhilarating as it is in the mountains to the westward.

It is probable that a great deal of the well-known energy and enterprise characteristic of Kansans can be attributed to the invigorating effect of its climate, and especially the cold, dry air that sweeps across the state in winter. An eminent authority has stated, "the most vigorous people physically and the most resourceful mentally are found in the most northerly regions, that will produce not simply cereals, but an abundance of them."

Another very common fallacy about Kansas weather is that it has changed materially since the state was settled, the prairie sod broken up, and trees planted. A few years ago a person who made the assertion in the western part of the state that the rainfall was not increasing permanently from year to year would have but little credence among old settlers who had seen what had been called "The Great American Desert," producing only buffalo grass and sage brush, changed into valuable crop-producing farms.

A short time ago the writer made a rather exhaustive study of all the available long precipitation records of the state, some of which, even in the western counties, were begun more than forty years ago, and it was found on comparing the average for the last half of the records with the average for the first half, that in the western third, where the increase in precipitation had been most strenuously maintained, there had been an actual, though slight, decrease in the annual amounts since the records were begun. Some of the other parts of the state showed slight increases and some slight decreases, demonstrating that there is reason to think the change in either direction is only temporary and may be reversed within a few years.

The writer has also investigated a great deal of precipitation data trying to decide another common belief that, while the total annual precipitation may not be changing as the years pass, there is more and more a tendency for rains to fall oftener and not so much in downpours, but so far the figures fail to bear this out definitely.

A few years ago a scientist prominent in the state made the announcement that his record of wind velocity, which had been made for many years with a standard type of anemometer, showed that the movement of the wind was decreasing from year to year. The well-known ability and integrity of this man caused his statement to be widely circulated and credited. It was afterwards discovered, however, that as this man, who lived to a ripe old age, became older his anemometer had been more and more neglected and worn, with the result that its record was no longer reliable, and it was registering less wind than really blew.

The wind record at the various Weather Bureau offices of the state, unfortunately, is of very little value in settling this question, as it has been necessary so often to change the location of these offices, and it is almost out of the question to compare the records now being obtained with those of previous years; but there is nothing known to meteorologists that would lead them to believe that the wind velocity over Kansas has changed in the least in the past 500 years. It is true that a person living on the open prairie in a frail shanty would notice the wind more than after he had built a more substantial home and grown trees for a windbreak, but there are no reliable data to show that the open prairie does not still have the same amount of wind it always had.

Another common delusion about Kansas weather is that the winters are becoming milder and the droughts less frequent and severe. This delusion I should like, personally, to find not a delusion, but it will have to give way to cold and unfeeling statistics. It is a common tendency with all of us to remember the cold winter years ago, when the snow lay deep on the ground from Christmas until spring, and the ground was frozen several feet deep, and the drought that withered the corn, forgetting the numerous favorable seasons that have passed. This has been especially true in Kansas, where the early settlers were poorly protected from the inclemencies of the weather, and still more poorly prepared in a financial way to undergo a crop failure resulting from a severe drought.

The winter of 1911-'12, only five years ago, was the coldest on the state's record, and the drought of 1913, less than 4 years ago, the most severe in the history of the state, with the possible exception of that of 1874, though doubtless many old settlers can recall winters when there was more suffering from the cold than in the one mentioned, and a great many years, especially 1860 and 1864, when the shortage of crops due to dry weather was more disastrous than in 1913.

In the light of all available knowledge, therefore, the fact seems to stand that, while Kansas has made great strides in an agricultural way in the past fifty years, and may make even greater strides in the next fifty years, the climate has not changed any since the Pilgrims landed at Plymouth Rock and will probably not change for centuries to come; also, that the golden harvests of the last twenty years have been the result of increased skill and industry in making the earth productive, and have been independent of any change in climate.

U. S. WEATHER BUREAU, TOPEKA.